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ABSTRACT: A study of the effects of family smoking habits on the symptoms of other family members has shown that symptoms of household members, especially children, are related to smoking habits within the households but are not significantly so when symptoms in adults are controlled.

Respiratory Symptoms Related to Smoking Habits of Family Adults*

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A study of the effects of family smoking habits on the symptoms of other family members has shown that symptoms of household members, especially children, are related to smoking habits within the households but are not significantly so when symptoms in adults are controlled.

It has been suggested that smoking habits of individuals in a family may have an effect on the health of other family members, particularly children, through environmental exposure to tobacco smoke.[1-4] Colley[1] has demonstrated such an effect, and Holland[2] (personal communication, August, 1974) has also inferred the possibility that such an effect exists. But, as noted by Colley[1] and others,[2,3] the data are complicated by concurrent relationships of children's symptoms to other familial factors, particularly the relation of children's symptom reports to parents' symptom reports, and it remains uncertain that parental smoking habits *per se* are related to symptoms in children.

This report examines the question of the effect of cigarette smoking in the household on household members. Personal smoking habits within age group, as well as parental symptom histories, are examined in this relationship. Children's symptoms are emphasized, and other important factors, such as social status and family size, are examined.

Methods

The Tucson Epidemiological Study of Obstructive Lung Diseases is a longitudinal study of a stratified cluster random sample of Anglo-white households in the community. Methods of study have been described in detail elsewhere.[4] The final sample consisted of 3,484 Anglo-white individuals from a total 1,655 households. Each individual within the household completed a self-administered questionnaire, which contained information on demographic characteristics, medical history, respiratory history, migration, smoking, and other factors possibly associated with obstructive pulmonary diseases. Respiratory symptom questions included those in the National Heart and Lung Institute Standardized Respiratory Symptom Questionnaire, a modification of the British Medical Research Council Respiratory Questionnaire. For subjects under age 15, the questionnaire was completed by the parent or guardian. Social and environmental histories, occupational histories on those employed, and family histories were obtained by trained nurse-interviewers. Objective tests performed included flow-volume measurements.

This paper is concerned with the symptoms of persistent cough, persistent phlegm, wheeze, physician-confirmed asthma or bronchial trouble, emphysema, and others.

Socioeconomic status was represented by the socioeconomic strata used in the initial selection of the population, by the head-of-household's education, and by family income. Each family's smoking and symptom histories were derived from the adult information.

Tabular analysis of data was performed, with all data processing being performed on a computer (CDC 6400). Parametric and nonparametric tests of significance were utilized.

Children under 15 years were presumed to be nonsmokers. Of the sixty 14-year-old children completing smoking histories, only two girls indicated any smoking history, and they smoked very few cigarettes.

Results

Children in households with present smokers have higher overall rates of persistent cough, persistent phlegm, wheezing on most days, and physician-confirmed "asthma, bronchial trouble, or emphysema" than those children in households with only ex-smokers or those who never smoked, as seen in Table 1. Although the trend exists for all of the conditions, only the trend for persistent cough was statistically significant. The results for all adult nonsmokers are also seen in Table 1. There was no significant trend in adult symptoms in relation to household smoking. There were no significant age differences in symptom prevalence rates in adult nonsmokers.

Further analyses were performed to determine if the effect observed in children might result from

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Table 1—*Prevalence Rates of Symptoms by Smoking History in the Household, Controlling for Individual Smoking History and Age*

Age and Individual Smoking Group by Household (HH) Smoking Habits	Prevalence Rate (per 100)				
	Persistent Cough	Persistent Phlegm	Wheezing Most Days	Physician-Confirmed ABE*	No.
Children (<15 yr)					
HH: Present smokers	10.4	5.9	3.9	21.7	337
Ex-smokers	3.7	3.7	1.8	16.6	163
Never smokers	6.3	2.4	0.8	17.5	126
Total	7.8	4.6	2.8	19.5	626
P (X²)**	<0.05	NS	NS	NS	...
Never smokers (+15 yr)†					
HH: Present smokers	6.8	8.6	4.5	17.6	267
Ex-smokers	8.1	6.5	5.5	22.6	310
Never smokers	10.3	8.6	4.4	18.9	682
Total	9.0	8.1	4.7	19.5	1,258
P (X²)**	NS	NS	NS	NS	...

*Asthma, bronchial trouble, or emphysema.
**NS, Not significant.
†Rates not significantly age-dependent in adults who never smoked.

differences in ages of children, social status, family size, or migration status in households of different smoking habits. These factors did not significantly differ between such households.

The prevalence rates of children's symptoms were examined in relationship to both current smoking habits and symptom histories of adults in the household (Table 2). Children in households containing adults with the specific symptoms had a higher prevalence of symptoms, regardless of the family smoking habits. When the presence of symptoms in adults was taken into account by partitioning households into those where adults had the symptom(s) and those where adults didn't have the symptom(s), no statistically significant difference remained in children's symptoms related to the household smoking habits. However, though not statistically significant, most children's symptoms were consistently higher in currently smoking families than in currently nonsmoking families.

Some prevalence rates of children's symptoms within presently smoking households with adult symptoms were significantly greater than symptom rates for children in the households without symptoms in adults.

There were no significant differences in children's prevalence rates of bronchiolitis, croup, pneumonia, or a combination of those three, in relation to the

Table 2—*Prevalence Rates of Children's Symptoms in Relation to Their Household's Adults' Smoking Habits and Symptoms*

Household Smoking and Symptoms	Prevalence and Prevalence Rates (per 100) of Children's Symptoms											
	Persistent Cough		Persistent Phlegm		Persistent Cough and/or Phlegm		Wheeze		Physician-Confirmed ABE*		All Respiratory Symptoms**	
	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate	No.	Rate
Households with symptoms												
Present smokers	29	16.9†	21	12.8†	40	20.0	115	43.7†	41	27.3	173	50.1
Ex- and never smokers	4	13.8	3	10.0	6	13.0	59	44.7	25	23.4	99	44.8
Households without symptoms												
Present smokers	16	7.2	6	2.6	13	6.6	32	24.1	47	19.3	20	39.2
Ex- and never smokers	11	3.7	6	2.0	11	3.9	46	23.4	28	12.6	28	25.9

*Asthma, bronchial trouble, or emphysema.
**All of preceding symptoms and exertional dyspnea (grade 2+); unconfirmed ABE; and physician-confirmed emphysema, chronic bronchitis, bronchiectasis, and/or asthma.
†Significantly higher ($P < 0.05$) than rate for children in households without symptoms (any smoking category), but not higher than ex- or never smokers in households with symptoms, as per tests of difference between proportions and chi-square.

smoking habits of either or both parents. No differences in findings were noted if one examined symptoms by whether the father alone, the mother alone, or both smoked.

Symptoms in children and in families were related to one another. When all the combinations of children's symptoms were examined in relation to adult household smoking and symptoms, the trends were almost always the same as previously found, though not statistically significant.

Discussion

The results from this study do not indicate the same significance of social status, family size, or specific age of children in relation to the effect of household smoking on children's symptoms that Colley[1] found, but they do confirm that symptoms within the adults of the household definitely appear to influence the symptoms reported for the children. This finding has far-reaching significant ramifications related to both the reporting of symptoms in children and factors which may be responsible for such familial aggregation of symptoms. Longitudinal follow-up of the children in the various types of households may help detect any long-term effect of paternal smoking.

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